

Should Australia's hospitals be reviewing the use of research in patient care by nurses, managers and allied health professionals? – A systematic review of recent evidence

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Abstract

Recently published studies were systematically reviewed to determine whether use of research in clinical practice by nurses, managers and allied health professionals in hospitals is currently sub-optimal, the factors influencing this and possible remedial strategies. The better studies confirmed that use of appropriate research is currently sub-optimal. The nature of the research and access to it is partly responsible for this. However, adoption of research findings is also currently hindered by factors inherent in hospitals and by the skills and attitudes of potential users of the research. Numerous remedial strategies have been suggested and hospitals could take responsibility for implementing many of them. However, most have yet to be evaluated. Studies into the use of research findings by nurses, managers and allied health professionals in Australian hospitals and trials of remedial strategies are recommended.

Scope and rationale

The infrequent use of relevant published research findings in patient care by nurses and physical therapists was first documented in the 1970s and 1980s (Ketefian 1975; Kielhofner & Barris 1984) and has been the subject of many subsequent studies as the research literature relevant to nursing and physical therapy has grown. Health care policy makers and providers need to know whether nurses, managers and allied health professionals regularly use appropriate research findings, as well as the barriers to the adoption of research findings and strategies to promote the use of research.

It has long been believed that for research findings to be used by a hospital's nurses, managers and allied health professionals, these staff not only have to be aware of the findings, but also have to see an opportunity for their use, be able to acquire and appraise information about them which results in a favourable attitude towards the findings, be willing and able to trial and evaluate the findings and be willing and able to modify their practice (Rogers 1983). Consequently, characteristics of the research, the potential users, their profession and the organisation in which they work, including its culture, could all promote or act as barriers to the use of research findings in clinical practice.

This first systematic review synthesises recent research findings about the frequency with which nurses, managers and allied health professionals in hospitals use research in clinical practice, the factors promoting or hindering this and possible remedial strategies.

Method

Aims

The first aim was to determine, by means of a systematic review of recent studies, whether use of research in clinical practice by nurses, managers and allied health professionals in hospitals is less than optimal. If this is so, further aims were to identify the factors responsible and match them to remedial strategies suggested in the studies.

Inclusion and exclusion criteria and search strategies

These are listed in Table 1. Earlier studies (> 5 years) were excluded to maximise the relevance of the findings to the present time. This was necessary because of the changes which have occurred in the education, training, roles and research productivity of nurses and allied health professionals during the 1970s, 1980s and early and mid 1990s (United Kingdom Central Council for Nursing, Midwifery & Health Visitors 1986; Berggren A-C 1996; Connolly, Lupinnaci & Bush 2001; Paul, Liu & Ottenbacher 2002).

Qualitative and quantitative studies were included to obtain the most comprehensive picture of factors influencing research use (Foss & Ellefsen 2002). Surveys provide a broad overview of the use of research by nurses, managers and allied health professionals while qualitative studies provide a deeper insight, putting the use of research into context and revealing the significance the staff attach to research findings.

Surveys with non-random or small samples (less than 100 subjects) or a large non-response bias were excluded. These have often been noted to be particularly common limitations of quantitative studies in this area (McCaughan et al 2002). Qualitative studies were excluded if the samples could not generate the type of knowledge needed to understand the structures and processes within which nurses, managers and allied health professionals practised (Popay, Rogers & Williams 1998). By 'structure' is meant the complexity, formalisation and centralization of the hospital or unit, for example, existence of an hierarchy, extent of reliance on rules and procedures, and where responsibility for decision making lies (Robbins & Barnwell 2002). It includes the factors that influence structure, such as, a hospital's goals and its external environment, for example, the qualifications of the labour force, the research and innovations available and government policy. By 'processes' is meant how tasks are allocated, areas of responsibility and authority, who reports to whom and formal co-ordinating mechanisms and interaction patterns followed. It includes efficiency drives, work practices and workloads. Qualitative studies were also excluded if their description was not detailed enough to reveal the significance which nurses, managers and health professionals attached to the use of research.

Authors were not written to as part of the search strategy because of the unlikelihood that most authors would respond and unpublished research was not included because of the difficulties in identification (Counsell 1997).

Table 1: List of inclusion and exclusion criteria, search strategies and data abstracted

Inclusion and exclusion criteria	Search strategies	Data abstracted
<p>Included if</p> <ul style="list-style-type: none"> • In English • Published in the last 5 years • Original research • Hospital-based 	<ul style="list-style-type: none"> • Key words 'Research' 'Utilisation' 'Hospitals' 'Health professionals' 'Nurses' 'Midwives' 'Physical therapists' 'Physiotherapists' 'Occupational therapists' Other matching key words 	<ul style="list-style-type: none"> • Purpose of study • Date published • Location/social context of study • Type and flexibility of study design • Sampling strategy • Recruitment strategy and response • Method and instruments used to collect data • Measure and/or frequency of research use • Barriers to, and facilitators' of, research use explored and/or identified • Remedial strategies suggested by study participants/authors • Authors' interpretation of meaning, significance and context of findings • Generalisability of findings
<p>Excluded if</p> <ul style="list-style-type: none"> • Located in a developing country • Addressed use of research in education or hospital management • Survey with large (>30%) non-response bias • Qualitative study with sample not yielding understanding of structures/ processes in which nurses, managers and allied health professionals work • Qualitative study not revealing significance which nurses, managers and health professionals attach to research use 	<ul style="list-style-type: none"> • Databases: Medline CINAHL Psych INFO • Software: OVID • Reference lists of retrieved articles • Hand searching of journals • Period: 10/97 - 10/02 	

Assessment of study quality

The quality of the surveys were assessed against the standards described by Stroup et al (2000) and of the qualitative studies against those proposed by Popay, Rogers & Williams (1998). The former involves focusing on the key components of survey design, which would include sampling methods, power, response, validity and appropriateness of data analyses and inferences drawn. The latter includes the use of research findings being viewed from within the professions; adaptation of methods to meet changing circumstances encountered during the course of the study; the sample being able to produce the type of knowledge necessary to understand the structures and processes in which the nurses, managers and allied health professionals worked; the description of the study being detailed enough to reveal the significance which nurses, managers and health professionals attached to the use of research; the comparing and contrasting of different sources of data, for example, from direct observation and interview; the movement from description of the data through quotes or examples to an analysis and interpretation of the significance which nurses, managers and allied health professionals attached to research; and the claims being made for the generalisability of the findings to other populations or groups.

Data synthesis

Results from the different studies were summarised qualitatively. Qualitative and quantitative studies were considered to be of equal importance (Foss & Ellefsen 2002).

Results

Ineligible studies

Nineteen studies published within the last five years reported original research into the use of research findings by one or more of the professions of interest. Eleven, all quantitative, were excluded (Dunn et al 1997; Closs & Lewin 1998; Parahoo 1999; Van Mullem et al 1999; Humphris et al 2000; Parahoo 2000; Parahoo, Barr &

McCaughan 2000; Retsas 2000; Tsai 2000; Oranta, Routasalo & Hupli 2002). Reasons for exclusions were a developing country location (1), not being predominantly hospital based (2), having non-random (5) or small (2) samples, lacking information about subject recruitment (1), having a large (47%-63%) non-response bias (4), not stating the response rate (2), and/or not reporting quantitative and qualitative data separately (1). All the qualitative studies included samples which led to an understanding of the structures and processes within which nurses, managers and allied health professionals practised and all provided a sufficiently detailed description of their data to enable the reviewer to interpret the significance which nurses, managers and allied health personnel and their professions attached to research.

Eligible studies

Table 2 shows the features of the eligible studies. Three were cross-sectional surveys and five qualitative. The only Australian study had to be excluded because of a large (50%) non-response bias (Retsas 2000). There were no studies of physiotherapists, paediatric or geriatric nurses and the studies of psychiatric and intellectual disability nurses had to be excluded also because of a large non-response bias (46%) (Parahoo 1999; Parahoo, Barr & McCaughan 2000). The qualitative study of occupational therapists in Table 2, which aimed for a representative sample but achieved a 58% response, was included because the authors demonstrated a lack of bias.

Table 2: Eligible studies

Reference	Country	Population	Sample	Response	Sample size	Type
Rodgers 2000	UK	Nurses	Regional	73%	680	Quant
Nilsson Kajermo et al 2000	Sweden	Nursing students, teachers & administrators	Local	81%	236	Quant
Nilsson Kajermo et al 1998	Sweden	Nurses	Local	70%	237	Quant
Omerly & Williams 1999	USA	Adult acute nurses	National	100%	20	Qual
Le May, Mulhall & Alexander 1998	UK	Nurses, midwives, health visitors & managers	Regional	100%	30	Qual
Carmiah 1997	UK	Nursing students & practitioners	Local	100%	100	Qual
Dysart & Tomlin 2002	USA	Occupational therapists	National	58%	209	Qual
Dubouloz et al 1999	Canada	Occupational therapists	Regional	100%	8	Qual

Quant = quantitative Qual = qualitative

Quality of the studies

All studies relied on the views of participants rather than direct observation of research use in clinical practice and were therefore similar in this respect. Four of the qualitative studies used in depth interviews whilst the other and all three quantitative studies relied on a postal questionnaire. The latter used existing well-validated instruments, namely, the Nursing Practice Questionnaire and the Barriers Scale, whose face and content validities have been established (Brett 1987; Funk, Champagne, Wiese & Tornquist 1991).

Although the methods employed are sometimes varied during the course of a qualitative study to meet changing circumstances, all the qualitative studies in this review used the same design throughout.

All the qualitative studies moved from description of their data through quotes or examples to an analysis and interpretation of the significance which nurses, managers and allied health professionals attached to research and none made claims for the generalisability of their findings to other populations or professional groups. They were therefore similar in these respects, too.

Level of research use

It was clear from all of the studies that research use in clinical practice is currently sub-optimal. Dubouloz, Egan, Wallerand & Zweck (1999) found that occupational therapists 'placed more emphasis on knowledge from clinical experience, clients and consultation with colleagues than they did on research literature'. Similarly Carmiah (1997) found that 'routine and task-orientated nursing practice is currently largely practised and valued despite the availability of a wide range of relevant research findings'. Nurses simply not having the time to implement research findings was raised by as many as 75% of participants in Omery & Williams' (1999) study and was among the ten highest ranked obstacles to research use in two quantitative surveys (Nilsson Kajermo, Nordström, Krusebrant & Björvell 1998 and 2000).

Quantifying research use, Dysart & Tomlin (2002) found that as many as 43% of occupational therapists had not used current research information to develop or alter therapeutic plans in the previous year, whilst Rodgers (2000) found that the median percentage of nurses always using each of fourteen well publicised, relevant research based practices was as low as 45%. Most practitioners in Le May, Mulhall & Alexanders' (1998) study acknowledged 'that there was (currently) a gap between research and practice'.

Factors associated with research use

Tables 3 to 5 show the factors the studies found were associated with research use in clinical practice. The two quantitative studies regarded factors ranked outside the top ten as unimportant and these have been given a '0' in the tables.

The qualitative studies identified a number of factors which the quantitative studies had not, for example, some factors associated with hospitals as organisations, and vice versa, for example, some factors associated with access to research findings. This further ratifies the decision to include both qualitative and quantitative studies in this review.

All studies had identified factors associated not only with the research itself but also with the potential users of the research and, most importantly for hospitals, with the organisations themselves. Raising the level of research use among nurses, managers and allied health professionals will therefore require a broad strategic approach.

Lack of skills in literature searching and appraisal of articles, negative attitudes to research, research being incomprehensible and not transferable to practice, and particularly significant for hospitals, lack of managerial support, not having researchers on staff and not having time to read and implement research findings were important barriers for both nurses and occupational therapists.

Four themes emerged from the factors the nurses and occupational therapists reported as influencing research use. These were education (in the skills to find and appraise research), resources (availability of relevant research, research expertise and time to find and implement research), attitudes (towards research as a basis for changing practice) and culture of the profession and organisation (whether research is valued and supported). These themes were closely entwined. In particular, the culture of an organisation strongly influenced the availability of resources, education and attitudes.

Table 3: Factors associated with the potential users of research found to influence use

Factors	Nilsson Kajermo et al 2000	Nilsson Kajermo et al 1998	Omery & Williams 1999	Le May, Mulhall & Alexander 1998	Carmiah 1997	Dysart & Tomlin 2002	Dubouloz et al 1999
Education:							
Educational level			+				
Degree type						0	
Continuing education				+ ^d		0	
Research training/ participation						+	
Applied research teaching				+ ^b			
Years of experience			+			0	
Lack of skills in:							
Literature searching					-	-	
Appraisal of papers	. ^a	0	-	. ^c	-	-	-
Clinically evaluating papers	0	0					
Statistics	. ^a	.		. ^b			
Not specified							
Attitudes to research:							
Not important			-	. ^b		-	0
Irrelevant to care	. ^a	0		. ^c	-	-	
Not basis to change practice	0	0	-	. ^c	-	-	0
Personality:							
Fear of risk taking				. ^c			-
No motivation for change				. ^c			-
Profession:							
No academic tradition		.					

+ = positive association, - = negative association, 0 = no association with research use
blank = not enquired after or mentioned
^a nursing teachers and administrators only ^b managers only ^c practitioners only ^d practitioners and managers

Table 4: Factors associated with the research found to influence use

Factors	Nilsson Kaijmo et al 2000	Nilsson Kaijmo et al 1998	Omery & Williams 1999	Le May, Mulhall & Alexander 1998	Carmiah 1997	Dysart & Tomlin 2002	Dubouloz et al 1999
Nature of research:							
Sparse	-	-	-	c			-
In foreign language	-	-					
Incomprehensible	h	h		c	-	-	
Conflicting	0	0				-	
Not transferable to practice	-	-			-	-	-
Undertaken by practitioners				+c			
Access:							
Unaware of research	e	h		c	-		
Research inaccessible							
Articles unavailable	-	-				0	
Not compiled in one place	-	-				f	
Library inconvenient						0	
Journal availability		h				0	
Internet/electronic database access			+			0	
Time for reading	+	+			+	+	

+ = positive association, - = negative association, 0 = no association with research use

blank = not enquired after or mentioned

c practitioners only e students only f rural occupational therapists only

h open ended questions

Table 5: Factors associated with hospitals as organisations found to influence research use

Factors	Nilsson Kajermo et al 2000	Nilsson Kajermo et al 1998	Omery & Williams 1999	Le May, Mulhall & Alexander 1998	Carmiah 1997	Dysart & Tomlin 2002	Dubouloz et al 1999
Internal:							
Non-teaching hospital				b			
Research culture			+	+b			
Research/development strategy				+			
Evidence based purchasing				+b			
Managerial/senior support	+	+	+	+c	+	+	+
Managerial expectations	+		+	+b			+
Inadequate resources	-	-	-			0	
Patient focused care			+				-
Workforce							
Students on site			+				
% Baccalaureates/Masters			+				
Researchers on staff	+	+	+	+b		0	+
Research advocate on staff				+b			
Unco-operative physicians/colleagues	-	-		-	-		
Affordable education				+b		+	
Time for implementation	+	+	+	+			+
Autonomy	+g	+				0	
External:							
National momentum for change				-			
Academic links			+	+b			

+ = positive association, - = negative association, 0 = no association with research use
blank = not enquired after or mentioned
b managers only cpractitioners only gteachers and students only

How the themes might be related to the changing structures and processes in which nurses, managers and allied health professionals work also began to emerge. Thus, educational factors have to be viewed against the level of education required to enter the professions and the ability of recruits to fully understand or value research (Omery & Williams 1999). The availability of relevant research has to be viewed against the beliefs among those working within and outside the profession about the quality of its research and its warranty for wide spread use (Le May, Mulhall & Alexander 1998; Omery & Williams 1999). The availability of time for research use has to be viewed against the changing workloads of nurses, managers and allied health professionals, efficiency demands, work practices and methods of delivering care (Le May, Mulhall & Alexander 1998; Omery & Williams 1999). Attitudes towards research being a basis for changing practice has to be seen against the changing focus of the work which might not always be seen to be compatible with an entirely scientifically orientated approach (Dubouloz, Egan, Wallerand & Zweck 1999). Whether an organisation values, enables and expects research findings to be used in patient care has to be viewed against the goals of the organisation and the political environment (Le May, Mulhall & Alexander 1998).

Strategies to promote use

Tables 6 and 7 show the strategies suggested by participants in the studies and their authors to overcome barriers to or facilitate research use. Some of the strategies address the structures and processes in which nurses, managers and health professionals' work. The strategies suggested by the study participants and authors complement one another. This implies that hospitals wishing to increase the level of research use should seek strategic ideas from both experts and consumers of research.

The tables also indicate the strategies (in the reviewer's opinion) for which hospitals, the professions, universities, journal editors and funding bodies could take primary responsibility. Hospital boards and their executive staff could take sole responsibility for many of the strategies. In addition, some of the other strategies would need to be, or could be, a co-operative venture between hospitals and universities. Even where strategies would have to be the primary responsibility of others, hospitals could still have a role in encouraging, advising upon and supporting change.

None of the participants cited any evidence for the effectiveness of the strategies they suggested. Whilst Nilsson Kajermo, Nordström, Krusebrant & Björvell (2000) cited research supporting the importance of education in changing attitudes and for positive attitudes, in turn, favouring research use, the only strategies suggested by authors to be formally evaluated were those in relation to the awareness of research (Carmiah 1997).

Discussion

This review has a number of strengths. It includes only contemporary research, both qualitative and quantitative studies, only surveys with representative or non-biased samples and only useful qualitative studies. In so doing, it provides a contemporary, comprehensive and reliable picture of the extent of research use by nurses, managers and allied health professionals, the factors influencing this and possible remedial strategies. A further strength is the giving of equal weight to the qualitative and quantitative studies. In the past researchers have tended to attach greater importance to the results of quantitative than qualitative studies without good reason (Foss & Ellefsen 2000). The limitations of the review arise from the state of the field, namely, the relatively small number of methodologically sound studies, the reliance on self-report, the lack of Australian studies and of studies of physiotherapists and specialist nurses.

It might be argued that a low perceived use of research does not necessarily constitute a problem. Not all research findings can or should lead to a change in clinical practice. However, a low reported use of research findings was also found in the study where specific practices could and should have been implemented and where there were no cost or safety implications (Rodgers 2000).

Having had to exclude the only Australian study because of the 50% non-response from potential participants raises the issue of whether the findings from other countries can be generalised to Australia. A low perceived use of research findings in clinical practice was found for occupational therapists and nurses (including

Table 6: Strategies suggested by participants in eligible studies to overcome barriers to, or facilitate, research use

Factor	Strategy
Education:	
Continuing education	Fund studying on full salary ^h Establish professional development units ^h
Research training	Provide education in scientific methods ⁱ
Lack of skills in:	
Appraisal of papers	Change type of education for students ^g
Attitudes to research:	
Irrelevant to care	Fund more practice relevant research ⁱ
Nature of research:	
In foreign language	Provide translation of foreign language articles ^k
Incomprehensible	Report research findings in user friendly understandable way ^k
Not transferable to practice	Fund more practice relevant research ⁱ More collaboration with hospital staff ^l
Access:	
Unaware of research	Local small group discussions of research findings ⁱ Information sheets ⁱ Scientific journals written for nurses ^k
Research inaccessible	Research fora ⁱ Local research awareness groups ⁱ
Journal availability	Fund hospital units to subscribe to journals ^h
Time for reading	Provide staff with time to visit library, read and discuss research findings with colleagues ^h
Internal:	
Research culture	Establish research/ethics committees ^h Establish a research centre ^h
Inadequate resources	Fund more staff ^h Schedule regular study time for staff ^h
Researchers on staff	Fund research utilisation positions or units ^h More co-operation between educators and practitioners ^{gi}
Unco-operative physicians	More multiprofessional initiatives and research ^g

Source: Nilsson Kajermo, Nordström, Krusebrant & Björvell 1998 & 2000; Le May, Mulhall & Alexander 1998

^hhospitals', ⁱprofessions', ^juniversities', ^kjournal editors' and ^lfunding bodies' primary responsibility

Table 7: Strategies suggested by authors of eligible studies to overcome barriers to, or facilitate, research use

Factor	Strategy
Education:	
Research training/participation	Provide education in research utilisation ^h
Lack of skills in:	
Critical appraisal	Provide courses on critical appraisal ^h
Attitudes to research:	
Irrelevant to care	Involve staff temporarily in data collection ^h Education about research ^h
Not basis to change practice	Fora on integration of research and practice ⁱ Establish practice and research committees ^h 'Researcher in residence' programs ^h
Access:	
Unaware of research	Establish research interest groups ^h Feedback on research use to unit managers ^h Link ward managers with educators to promote use of research findings in daily work ^{hi} Research compendia and presentations ⁱ Research journal clubs/meetings ^h Nominate staff to attend courses ^h Mentoring ^h Include practical application of research findings in student courses ⁱ
Internal:	
Research culture	Appoint staff to provide leadership in promoting a culture committed to and supportive of research utilisation ^h Integrate use of research into strategic plans ^h Practice committees and quality improvement groups to deliberately integrate research findings into practice through recommendations, standards and guidelines ^h
Managerial/senior staff support	Identify and commit expertise, time and funds to research utilisation activities ^h Develop and support research committees ^h
Managerial expectations	Staff appraisals to include use of research in achieving clinical and operational outcomes ^h
Patient focused care	Research utilisation should address clinical and organisational priorities ^h
Researchers on staff	Appoint advisors in research utilisation ^h
Autonomy	Decentralise authority and share management responsibilities between professions ^h

Source: Nilsson Kajermo, Nordström, Krusebrant & Björvell 1998 & 2000; Omery & Williams 1999; Le May, Mulhall & Alexander 1998; Carmiah 1997

^hhospitals', 'professions', 'universities', 'journal editors' and 'funding bodies' primary responsibility

midwives) in two or three different countries and samples using a variety of methodologies. Thus it seems likely that a well-conducted study would also find a low perceived use of research by nurses, managers and allied health professionals in Australia's hospitals.

One study observed the use of research findings by hospital nurses and although the study also collected interview data, the two methods were not compared (McCaughan et al 2002). However, exploring the survey findings through in depth interviews boosts confidence in the finding that research use in hospitals is currently sub-optimal and the factors found to be associated with the low use. For example, in the surveys both nurses and occupational therapists identified lack of time for reading about and implementing research findings as a barrier. Lack of time could have reflected a lack of interest, knowledge or job control rather than a real lack of time. However, the latter was confirmed when the factor was explored in depth with both practitioners and managers during qualitative studies.

Some of the strategies which hospitals could take responsibility for implementing (particularly funding study leave and establishing research positions and centres) have budgetary implications. For this reason, hospitals will need evidence about the most efficient way of implementing the strategies, evidence that the strategies are effective and will have a positive impact upon research use and eventually patient outcomes.

If hospitals in Australia decide to review the use of research findings in patient care by their nurses, managers and allied health professionals there are a number of matters which were raised in the results section of this paper that ought to be considered during planning. For a comprehensive picture of the issues involved both quantitative and qualitative studies are necessary. When designing surveys, close attention will need to be given to power, sampling methods and recruitment strategies if the problems that have beset previous studies are to be avoided. The possibility of corroborating self-reports should be explored further.

It is most important that factors associated with the organisation and its culture be considered when identifying the barriers and facilitators to research use. It is also important to consider the structures and processes in which nurses, managers and allied health professionals work. Any strategy to raise the level of research use should be properly evaluated. The strategy will need to be comprehensive, accommodate ideas from both potential users of research and experts, and be a co-operative venture with universities, funding bodies and journal editors. Thought should also be given to filling some of the gaps in the literature, for example, the lack of national studies, which has meant that the extent of the variation in the use of research across a particular country has not been able to be fully explored, and well conducted studies of physiotherapists and paediatric, geriatric and psychiatric nurses.

Conclusion and recommendations

All recent methodologically sound surveys and qualitative studies found that the self-reported use of research in clinical practice by hospital nurses, managers and allied health professionals is currently sub-optimal. Although there were no Australian studies in the sample, the finding is likely to be applicable to Australia. Organisational and personnel factors, as well as the nature and accessibility of research itself, contribute to the sub-optimal use. This suggests a broad strategic approach will be required to raise the level of research use. Most of the strategies suggested by the studies are yet to be implemented and evaluated. Hospitals could take sole responsibility for many of the strategies. Studies into the use of research findings by nurses, managers and allied health professionals in Australian hospitals and trials of remedial strategies, if necessary, are recommended.

References

- Berggren A-C 1996, 'Swedish midwives' awareness of attitudes to and use of selected research findings', *JAN*, vol 23, no 3, pp 462-70.
- Brett J 1987, 'Use of nursing practice research findings', *Nurs Res*, vol 36, no 6, 344-9.
- Carmiah S 1997, 'Utilization of nursing research in practice and application strategies to raise research awareness amongst nurse practitioners : a model for success', *JAN*, vol 26, no 6, pp 1193-202.
- Closs SJ, Lewin BJP 1998, 'Perceived barriers to research utilisation : a survey of four therapies', *Br J Ther Rehabil*, vol 5, no 3, pp 151-5.
- Connolly BH, Lupinnaci NS, Bush AJ 2001, 'Changes in attitudes and perceptions about research in physical therapy among professional physical therapist students and new graduates', *Phys Ther*, vol 81, no 5, pp 1127-34.
- Counsell C 1997, 'Formulating questions and locating primary studies for inclusion in systematic reviews', *Ann Intern Med*, vol 127, no 5, pp 380-7.
- Dubouloz C-J, Egan M, Wallerand J, Zweck C von 1999, 'Occupational therapists' perceptions of evidence – based practice', *Am JOT*, vol 53, no 5, pp 445-53.
- Dunn V, Crichton N, Roe B, Seers K, Williams K 1997, 'Using research for practice : a UK experience of the Barriers Scale', *JAN*, vol 26, no 6, pp 1203-10.
- Dysart AM, Tomlin GS 2002, 'Factors related to evidence-based practice among US occupational therapy clinicians', *Am JOT*, vol 56, no 3, pp 275-84.
- Foss C, Ellefsen B 2002, 'The value of combining qualitative and quantitative approaches to nursing research by means of method triangulation', *JAN*, vol 40, no 2, pp 242-8.
- Funk SG, Champagne MT, Wiese RA, Tornquist EM 1991, 'Barriers: the barriers to research utilization scale', *Nurs Res*, vol 4, no 1, pp 39-45.
- Humphris D, Littlejohns P, Victor C, O'Halloran P, Peacock J 2000, 'Implementing evidence-based practice : factors that influence the use of research evidence by occupational therapists', *Br J Occup Ther*, vol 63, no 11, pp 516-22.
- Ketefian S 1975, 'Application of selected nursing research findings into nursing practice', *Nurs Res*, vol 24, no 2, pp 89-92.
- Kielhofner G, Barris R 1984, 'Mental health occupational therapy : trends in literature and practice', *Occup Ther in Mental Health*, vol 4, no 1, pp 35-40.
- Le May A, Mulhall A, Alexander C 1998, 'Bridging the research-practice gap : exploring the research cultures of practitioners and managers', *JAN*, vol 28, no 2, pp 428-37.
- McCaughan D, Thompson C, Cullum N, Sheldon TA, Thompson DR 2002, 'Acute care nurses perceptions of barriers to using research information in clinical decision making', *JAN*, vol 39, no 1, pp 46-60.
- Nilsson Kajermo K, Nordström G, Krusebrant A, Björvell H 1998, 'Barriers and facilitators of research utilization as perceived by a group of registered nurses in Sweden', *JAN*, vol 27, no 4, pp 798 – 807.
- Nilsson Kajermo K, Nordström G, Krusebrant A, Björvell H 2000, 'Perceptions of research utilization : comparison between health care professionals, nursing students and a reference group of nurse clinicians', *JAN*, vol 31, no 1, pp 99-109.
- Omery A, Williams RP 1999, 'An appraisal of research utilisation across the United States', *JONA*, vol 29, no 12, pp 51-6.
- Oranta O, Routasalo P, Hupli M 2002, 'Barriers to and facilitators of research utilization among Finnish registered nurses', *J Clin Nurs*, vol 11, no 2, pp 205-13.

- Paul S, Liu Y, Ottenbacher KJ 2002, 'Research productivity among occupational therapy faculty members in the United States', *AmJOT*, vol 56, no 3, pp 331-4.
- Parahoo K 1999, 'Research utilization and attitudes towards research among psychiatric nurses in Northern Ireland', *J Psych Ment Hlth Nurs*, vol 6, no 2, pp 125-35.
- Parahoo K 2000, 'Barriers to, and facilitators of, research utilization among nurses in Northern Ireland', *JAN*, vol 31, no 1, pp 89-98.
- Parahoo K, Barr O, McCaughan E 2000, 'Research utilization and attitudes towards research among learning disability nurses in Northern Ireland', *JAN*, vol 31, no 3, pp 607-13.
- Popay J, Rogers A, Williams G 1998, 'Rationale and standards for the systematic review of qualitative literature in health services research', *Qual Health Res*, vol 8, no 3, pp 341 - 51.
- Retsas A 2000, 'Barriers to using research evidence in nursing practice', *JAN*, vol 31, no 3, pp 599-606.
- Robbins SP, Barnwell N 2002, *Organisational theory*, Pearson Education Australia, Frenchs Forest New South Wales.
- Rodgers SE 2000, 'The extent of nursing research utilization in general medical and surgical wards', *JAN*, vol 32, no 1, pp 182-93.
- Rogers E 1983, *Diffusion of innovation*, Free Press, New York.
- Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, Moher D, Becker BJ, Sipe TA, Thacker SB 2000, 'Meta-analysis of observational studies in epidemiology', *JAMA*, vol 283, no 15, pp 2008-12.
- Tsai S 2000, 'Nurses' participation and utilization of research in the Republic of China', *Int J Nurs Studies*, vol 37, no 5, pp 435-44.
- United Kingdom Central Council for Nursing, Midwifery and Health Visitors 1986, *Project 2000 : a new preparation for practice*, UKCC, London.
- Van Mullem C, Burke LJ, Dobmeyer K, Farrell M, Harvey S, John L, Kraly C, Rowley F, Sebern M, Twite K, Zapp R 1999, 'Strategic planning for research use in nursing practice', *JONA*, vol 29, no 12, pp 38-45.